

# BANGALORE RURAL DISTRICT

## C H A P T E R I

### G E N E R A L

**B**angalore Rural district came into being on the 15th August 1986 with the division of Bangalore district into Bangalore Rural and Bangalore (Urban). The district occupies 16th place in size, Bidar, Mandya, Kodagu and Bangalore (Urban) districts occupying next ranks in succession in the State. Bangalore Rural district is located in the south-eastern corner of Karnataka State. Spanning a geographical area of 5,814 sq km, the district lies stretched between the latitudinal parallels of  $12^{\circ} 15' N$  and  $13^{\circ} 35' N$  on the one hand and the longitudinal meridians of  $77^{\circ} 05' E$  and  $78^{\circ} E$  on the other. The new district physically almost surrounds the Bangalore (Urban) district except having an opening in the south-east, the Anekal taluk, the connecting area between Kanakapura and Hoskote taluks, being a part of the Bangalore (Urban) district and the headquarters of the new district is at Bangalore itself. The district on the plateau with an average elevation of 600 to 900 metres from mean sea level has ranges of hills which are actually spurs of the Eastern Ghats, stretching northwards with peaks like the Banantimari Betta, Mudawadi Betta, Bilikal Betta, Siddadevara Betta, etc. The Savandurga and the Shivaganga peaks are another row of hill ranges, spreading upto the Nandi hills, running across the Bangalore (Urban) district. Bangalore Rural district had many prehistoric sites at places like Jadigenahalli (Hoskote taluk), Bellandur and Savandurga. The district abounds in wonderful tourist spots. Places of scenic beauty, tall hills, forts and beautiful monuments beckon the tourists to visit them. The new district forms a part of Deccan Plateau and the rock formations belong to the category of Peninsular Gneiss. The granite gneisses that abound in Kanakapura, Nelamangala, Devanahalli and Ramnagaram taluks have created captivating landscapes all along and they have provided jobs to hundreds engaged in quarrying.

The Arkavati, the Kanva and the Dakshina Pinakini are the tributary rivers which flow through the district in the general direction from north to south. Cultivable lands are mainly rain-fed and dry farming is a characteristic feature of the district. By and large, this Rural district is agricultural and ragi is the main crop though mulberry is raised over considerable tracts. The climate of the district is salubrious and very agreeable. It is devoid of extremes. But rainfall is meagre, and as no major river flows in the district irrigation facilities are also limited. This district too had often suffered from deficit and capricious rainfall conditions and the resultant phenomenon of crop failure. The contribution of horticulture to the economy of the district is quite substantial. The district has considerable tracts under horticultural crops like mango and grapes. Betelvine gardens are also seen in many places. Animal husbandry is being practised since generations as an adjunct to agriculture. A high degree of urbanisation of Bangalore city has enhanced the economic importance of dairying, poultry keeping and horticulture which provide livelihood to a very large section. Considerable numbers are also engaged in raising sheep for wool as well. Channapatna, Ramanagaram, Vijayapura and Kanakapura have been the most notable centres of sericulture and Dodballapur and Devanahalli are remembered for prosperous weaving industry. The toys of Channapatna, of lacquer-ware and the pottery objects of Ramanagaram are the outcome of flourishing crafts. Considerable number of people are engaged in rolling beedies and agarbattis.

#### ORIGIN OF NAME

The Bangalore Rural district derives its name from its headquarters town, Bangalore and majority of the district consists of rural areas. The earliest reference to the name is seen in a ninth century Ganga inscription from Begur as 'Benguluru'. The present name Bangalore is the anglicised form of 'Bengaluru'. A popular story tries to suggest the origin of 'Bengaluru' from 'Benda kaluru'. Hoysala Ballala, during his long journey is stated to have been fed by an old woman, with *benda kalu* (boiled beans). The prince named the place as 'Benda kala uru'. But the story is incredible, as the place had the present name much earlier than the Hoysalas. It appears to have had a floral origin from the tree *benga* or *rakta honne* in Kannada (*Pterocarpus marsupium* Roxb., the Indian Kino).

The district lies in the southern maidan region of the State and is by and large an open country which is lacking in natural barriers. Bangalore Rural district is bounded on the north by Tumkur and Kolar districts; on the south by Mandya and Mysore districts

and Tamil Nadu State; on the east by Kolar district and Tamil Nadu State and on the west by Tumkur and Mandya districts. The outline map of the district seems to roughly resemble a human ear, the hollow in the centre and the portion connecting the ear to the head representing the Bangalore (Urban) district. For a distance of about 16km on the south, the river Cauvery separates the district from Mysore district narrowing at one point called the Mekedatu 'goat's leap'.

## AREA AND POPULATION

Bangalore Rural district has an area of 5,814sq km, and it forms about 3% of the total area of the State. Out of the total population of 14,52,044 persons males constituted 7,42,581 and the rest were females as per 1981 census. The urban population of the district accounted to 2,52,198 (16% of the total population) while the rural population reckoned 11,99,846 (84% of the total population). The density of population of the district is 250 persons per sq km and the district ranks IV in density in the State. Bangalore Rural district is composed of eight taluks, 35 hoblies, 1,707 inhabited and 177 uninhabited villages, nine towns and 102 Mandal Panchayats. Kanakapura taluk is the largest taluk with an area of 1,590 sq km while Devanahalli is the smallest taluk in the district with an area of 451sq km.

## HISTORY OF THE DISTRICT AS AN ADMINISTRATIVE UNIT

Historically, the earliest dynasty which established its sway over this district is that of the Gangas. In about the fourth century A.D., the Gangas established themselves at Kolar and the territory comprised in Bangalore Rural district formed part of Gangavadi -96,000 and Honganur of Channapatna taluk was the chief town of a sub-division, called Chikka Gangavadi, which occupied the Shimsha valley. During the Seventh century, Mankund was a place of great importance and was the second royal residence of Ganga Bhuvikrama (654-79) and also of Shivamara (679-726). In the eight century Shri Purusha made Manyapura (Manne of Nelamangala taluk) his royal residence and later it was a major centre under the Rashtrakutas. Manne or Mannekadakam of Tamil records had been the headquarters of Rashtrakutas Governor Kamarasa. Certain parts of the district, especially in the east, were held by the Nolamb Pallavas.

Inscriptions belonging to the reign of Rajendre Chola and Kulothunga Chola II discovered in different parts of this district amply testify the fact that the district too was annexed by the

Cholas by early eleventh century. The Cholas renamed Malurpatna of Channapatna taluk as Nikarili Cholapuram and the area around Manne of Nelamangala taluk as Vikrama Cholamandalam. Magadi town is said to have been founded by a Chola king. The district was a part of the division called Mudigonda Cholavolanadu of the Cholas and it had sub-divisions like Kilalvenadu, Murushunadu, Shigalnadu, etc. Though the Hoysalas conquered the western parts of the district during the early part of 12th century, the Cholas continued in the eastern parts of the district till the close of the 12th century. Inscriptions of the Hoysala kings, including those belonging to Vira Ballala (1173 to 1220) are found all over the district. When Hoysala kingdom was divided between the brothers Narasimha III and Ramanatha, the northern portions of the district came to be included in the possessions of Ramanatha who used to hold his court Kundani in Kolar District. Shortly after the fall of Hoysala rule, the district became a part and parcel of the great Vijayanagar empire. Local rulers (*palegars*) flourished under the empire. Avati Nada Prabhus have an unique place in the history of Bangalore district. In 1537, Kempe Gauda, the most illustrious ruler of the Yelahanka Nada Prabhus, founded Bangalore at its present location. The western parts of the district were under the control of Jagadeva Raya who had his capital at Channapatna. Chamaraja Wodeyar annexed Channapatna and its neighbourhood in about 1630 A.D.

IN 1638 A.D. Ranadaula Khan, the Bijapur general captured Bangalore, forced Kempe Gauda to retire to Savandurga and made Bangalore his chief residence, and Shahji was appointed Governor of the southern Carnatic districts subdued by the Bijapur forces. Bangalore, Hoskote, Dodaballapur etc. were granted as a *jagir* to Shahji. In 1664 the *jagir* devolved on his son Venkoji. Later Shivaji over-ran these territories in about 1677 to establish his claim over his parental estate and by an amicable settlement between the brothers, Bangalore and its neighbourhood remained in the possession of Venkoji. In 1689 Khasim Khan captured Bangalore & Dodballapur. Bangalore was granted to Chikkadevaraya Wodeyar. In 1728 Devaraya, the *Dalavayi* of Dodda Krishna Raja Wodeyar attacked Magadi and forced Kempe Gauda to surrender his territories to Mysore.

In 1749, Devanahalli was annexed to Mysore kingdom by Haider Ali. He threw the Marathas out of Bangalore in 1758 and secured it as a *jagir*. In 1761, Haider Ali secured Hoskote and Dodballapur, the *jagir* of Abbas Kuli Khan from Basalat Jung and he virtually took over the administration of the entire Mysore kingdom. In 1791, Lord Cornwallis captured Bangalore from Tipu Sultan on behalf of British. Soon Devanahalli and other places were also annexed and the hill

forts like Ramagiri, Shivanagiri, Savandurga, etc. too were captured. But they were soon returned to Tipu. On the death of Tipu Sultan in 1799, Bangalore district came to be included in the treaty of Shrirangapattana as the territory of the Wodeyars of Mysore. Under the restored government which followed, the districts of Bangalore and Kolar constituted the Bangalore *foujdari*, which was afterwards called the Bangalore Division. This position continued until the formation of Nandidurga division in 1863. It was in that year that Bangalore district came to be created, separating Kolar district from it. The Clospet (Ramanagaram) sub-division comprising of the taluks of Channapatna, Magadi and Kanakanhalli (Kanakapura) was formed in 1884. Devanahalli taluk was abolished in 1882 but re-established in 1886. In 1873 Channapatna was formed into a sub-taluk of the Closepet taluk but in 1892 its former status was restored and Closepet (Ramanagaram) was made its sub taluk. Ramanagaram was upgraded into a taluk in 1928. Magadi taluk was established in 1873. In 1949, Clospet and Kankanhalli taluks were renamed as Ramanagaram and Kanakapura taluks respectively.

#### TERRITORIAL CHANGES

In ~~1948~~ 1946, Bangalore was divided into Bangalore Urban and Bangalore Rural districts. The Bangalore Rural district comprised the taluks of Dodballapur, Nelamangala, Hoskote, Devanahalli, Anekal, Kankanhalli, Clospet (Ramanagaram) and Magadi, while the Bangalore Urban district was left with the then civil station and the taluks of Bangalore North and Bangalore South (including Bangalore city). When the Bangalore City Corporation was formed, the Urban district was considered unnecessary and in 1950, it was re-amalgamated with the Bangalore Rural district. Seven villages surrounding Marsur which were enclaves in Anekal taluk but were part of Madras Presidency came to be merged with Anekal taluk in about 1950. After the States Reorganisation and consequent to rapid expansion of the city and its problems in 1958, a proposal was mooted to bifurcate the district once again. In 1962, the district was divided into Bangalore Urban district consisting of Bangalore North and Bangalore south taluks and Bangalore Rural district with the remaining nine taluks. After four years in 1966, the Bangalore Urban district was again merged with the Rural district. The main reason behind this amalgamation was the appointment of another senior officer as a full time Chairman of the City Improvement Trust Board. Nearly two decades after the second merger of Bangalore Urban and Rural districts, the district was bifurcated again in August 1986.

The Bangalore Rural district with its headquarters at Bangalore consists of Channapatna, Ramanagaram, Kanakapura, Dodballapur, Hoskote (excluding Bidarahalli hobli), Magadi (excluding Tavarekere hobli), Devanahalli (except Jala hobli) and Nelamangala (except Dasanapura hobli) taluks. The Bangalore Rural district is now organised into eight taluks which are grouped into two sub-divisions, namely Dodballapur sub-division, comprising of Dodballapur, Hoskote, Devanahalli and Nelamangala taluks and Ramanagaram sub-division comprising of Ramanagaram, Channapatna, Magadi and Kanakapura taluks. The total number of villages taluk wise are indicated in the following statement.

Statement showing the total number of villages taluk-wise and hoblies

Sl. Taluk no.	Hobli	Number of		
		Villages	Towns	Mandals
1) Channapatna	1) Channapatna	38		14
	2) Virupakshipura	59		
	3) Maluru	48		
		<u>145</u>		
2) Devanahalli	1) Devanahalli	61		8
	2) Vijayapura	46		
	3) Channarayapatna	56		
	4) Kundana	57		
		<u>220</u>		
3) Dodballapur	1) Dodballapur	68		12
	2) Madhure	42		
	3) Doddabelavangala	64		
	4) Sasalu	58		
	5) Tubagere	67		
		<u>299</u>		
4) Hoskote	1) Hoskote	41		12
	2) Sulibele	69		
	3) Nandagudi	72		

Sl. Taluk no.	Hobli	Number of		
		Villages	Towns	Mandals
	4) Jadigenahalli	75		
	5) Anugondanahalli	42		
		<u>299</u>		
5) Kanakapura	1) Kanakapura	47	1	20
	2) Harohalli	39		
	3) Doddamaralawadi	46		
	4) Kodihalli	45		
	5) Uyyamballi	35		
	6) Sathnur	46		
		<u>258</u>		
6) Magadi	1) Magadi	66	1	10
	2) Madabal	58		
	3) Thippasandra	45		
	4) Kudur	49		
	5) Solur	67		
		<u>285</u>		
7) Nelamangala	1) Nelamangala	95	1	11
	2) Sompura	74		
	3) Thyamagondlu	74		
		<u>243</u>		
8) Ramanagaram	1) Ramanagaram	27	1	11
	2) Bidadi	48		
	3) Kylanchara	35		
	4) Kutagal	25		
		<u>135</u>		

The taluk-wise latitude, longitude, area in sq km, population, elevation in metres, number of raingauge stations and annual rainfall in mm of Bangalore Rural district are given in Table I at the end of this Chapter.

The Bangalore Rural and Bangalore (Urban) districts and the Malur taluk of Kolar district are under the jurisdiction of Bangalore Metropolitan Authority.

### TOPOGRAPHY

The central, northern and eastern portions of the district are characterised by an open countryside consisting of vast stretches of undulating plains. The uplands are often bare or covered with low scrub jungles and the low lands are dotted with series of irrigation tanks. It represents an uplifted peneplain at an elevation of about 900 metres. The surface has been dissected on the western and southern parts of the district giving rise to a broken and rugged topography. In the west, the terrain is rugged and broken and is composed of a succession of hills and valleys intersected by rocks and rapid streams with sandy beds. In south, the hills get closer. The lands are covered with denser vegetation and the general level declines as one moves south towards the Cauvery. A range of hills from Kanakapura in the south to Nijagal in the north formed of coarse grained granite is a prominent topographic feature. The hills are usually boulder strewn and covered with scrub jungle. In some places, granitic hills abruptly rise from the surrounding plain forming conspicuous landmarks. The valley in between the granitic hills form very fertile tract with abundant supplies of water harnessed by means of wells. The low lying plain country is marked by a series of tanks varying in size from small ponds to considerable lakes. There are no natural lakes in the district. But some of these tanks like Hoskote, Madhure, Dodballapur, etc. adorn the countryside forming beautiful spreads of water. These tanks serve to store rain water for a temporary period and making it available for agriculture. Among the hills found in the district, the following are notable: Shivaganga Betta 1,380 metres, Savanadurga Betta 1,207 metres, Nijagal Betta 1,070 metres, Ramagiri Betta 919 metres, Kabbaldurga Betta 1,050 metres, Banantimari Betta 1,043 metres, Bilikal Betta, Mudavadi Betta and Narasimhadevara Betta

The Savanadurga Betta (Magadi taluk) is an enormous mass of granite which stands on a base of about 12 km in circumference and rises to a height of 1,207 metres above MSL. The hill consists of two peaks, one called Bilibetta or white peak, another Karibetta



or black peak. Former names of the place were Savandi Durga and Krishnaraj Giri, later named as Savandurga and it is about eight km from Magadi. The Shivaganga Hill, conical shaped, rises to a height of about 1,380 metres above the MSL. The puranas give it the name of Kakudgiri. Nijagal Betta also called Suragiri, in the north-west of Nelamangala taluk is accessible only on the north and east. Ramagiri Betta, a picturesque on the left bank of the Arkavati, is about five km north of Ramanagaram and give its name to the taluk. Sivagiri is a large fortified rock, near Ramanagaram on the right bank of Arkavati. The following heights above the level of sea serve to show the general elevation of the upper plain surface. Channapatna 670 m, Devanahalli 899 m, Dodballapur 892 m, Hoskote 869 m, Kanakapura 625 m, Magadi 853 m, Nelamangala 884 m, Ramanagaram 686 m, Thyamagondlu 899 m, Sompura 926 m and Vijayapura 884 metres.

### RIVERS

A major portion of Bangalore Rural district lies in the Arkavati valley. The basins of the Dakshina Pinakini and the Shimsha account for small portions of land in the eastern and western sectors respectively. A line drawn north and south from the Nandidurga range of hills to the west of Bangalore and then to Anekal would run along the highest parts of the ridge that separates the Arkavati basin from that of the Dakshina Pinakini. This watershed forms the eastern boundary of the Cauvery system. A broken chain of rocky hills which runs parallel to this watershed extends from the western corner of Nelamangala taluk through the taluks of Magadi, Ramanagaram and Channapatna as well as Kanakapura. Lands lying west of this hilly belt are drained by the Shimsha river.

The Arkavati, the Kanva and the Dakshina Pinakini (Southern Pennar) are the rivers which flow through the district in the general direction from north to south.

### THE ARKAVATI

The Arkavati is a tributary of the Cauvery and its source is a well in the south-western portions of the Nandi Hills. Taking a south-westerly route, the river enters Dodballapur taluk, passes through the eastern portions of Nelamangala taluk, receives the rivulet, Kumudvati from the west at Tippagondanahalli and then flows through the Magadi taluk, passing east of Savanadurga. Penetrating between the hills, Ramagiri and Shivanagiri, it runs through Ramanagaram taluk and then through Kanakapura taluk. Another tributary, the Vrishabhavati, meets the river near Muduvadidurga and finally

the river flows into the Cauvery on the southern borders of the district in Kanakapura taluk at Sangama. The length of the main stream is about 190 km. Though the river is not exactly a seasonal stream, in the summer months it presents the usual aspect of a sandy bed with a small current of water flowing at one side. However, the holes scooped in the sandy bed furnish a ready supply of water. During rainy season, it is a formidable stream, swollen by the mountain torrents, especially near Magadi whereafter it traverses mainly amidst a wild countryside full of rocky hills and precipices. Major part of its course, especially the southern part is through wild country amid rocky hills. Consequently its waters are little utilized. In the northern upstream side it finds many big tanks like Dodballapur and Madhure in the district apart from Hesaraghatta and Thippagondanahalli tanks in Bangalore Urban district.

#### THE KANVA

The Kanva river emerges from the hills to the north of Malur in Channapatna taluk and enters a broad and fertile valley that stretches out upto the borders of the taluk and finally it joins the Shimsha river. A reservoir has been formed by building a dam across the river near Abbur and its waters are being effectively utilized for purposes of irrigation. Number of coconut gardens are found on the lower parts of the river, the soil being well suited for the purpose.

#### THE DAKSHINA PINAKINI

The Dakshina Pinakini takes its name from Pinaka, the bow of Shiva. Along with its northern counterpart it rises in the range of the Nandi Hills at the Channa Keshava Betta. Its course, after entering the district, is southwards and it passes through the taluks of Devanahalli and Hoskote where it forms the large lakes known as Jangamakote (Kolar district) and Hoskotekere. The river continues its southward journey and crosses the district and finally crosses the state border at a place a little to the east of Sarjapura in Anekal taluk of Bangalore district. The total length of this river within Bangalore Rural district is about 60 km.

The rivers that flow through the district are too small to evoke any hopes about the feasibility of putting up any major irrigation works within the district. The irrigation potential is indeed quite low. Currently some amount of water from these rivers, is however being utilized to a little extent in different parts of the district. Kanva reservoir which was built in 1946 is the only irrigation project

that deserves mention as an important source of irrigation with a network of canals. Mention may also be made of the Manchanabele project in Magadi taluk and Iggalur project in Channapatna taluk each of which when completed is likely to provide irrigation facilities to about 3,800 ha of land. (See Chapter IV).

## GEOLOGY

Bangalore Rural district forms part of the Deccan Plateau and is covered by peninsular gneiss, granites, basic dykes and laterites. The granites occur as intrusives in the gneissic complex and vary in colour, structure and texture. A small lenticular patch of Hornblende schist with a few runs of amphibolite is exposed north of Arajimbetahalli in between 10th and 20th KM on the Nelamangala - Dodballapur road. Inclusion of amphibolite are seen in the gneisses.

### GNEISSES AND GRANITIC GNEISSES

Nearly two thirds of the district forming the northern, eastern and south-eastern parts of the district, is composed of gneisses and granitic gneisses. The strike of foliation is usually NNE-SSE. They are traversed by pegmatite and quartz veins. The gneisses and granitic gneisses have undergone different degree of alteration and decomposition. The thickness of the decomposed zone ranges from 30 to 130 metres. The depth of the weathered zone is maximum in the valleys. This weathered zone is the water bearing formation and important from the point of view of groundwater storage. Charnockites are exposed in the southern parts of the district to the east of Hegnur and to the south-east of Satnur and north-west of Ambadahalli.

### GRANITES

The range of hills running on the western margin of the district is made up of coarse grained granites designated as Closepet granites. These granitic rocks occur in a well defined narrow belt 16-22 km in width, running north-south through Kanakapura, Ramanagaram, Magadi and Nelamangala taluks. The Closepet granite hill range stands out prominently from the surrounding gneissic country rising to 1,220 metres above mean sea level as bare rocky hills with precipitous domes. Granites of this series are usually coarse grained and porphyritic in texture. The granites are traversed by vertical and horizontal joints which splits the rock into huge blocks. The granites are hard, compact and massive. These are open joints and form important channel way through which rain water charges the groundwater reservoir. The decomposition of granites is quite different from

that of gneisses. The weathered zone of the granitic zone consists of broken portions of quartz feldspar with little or no clay. As the weathered zone consists of irregular pieces of varying dimensions the weathered rock is highly porous, holding substantial quantities of water. Wells excavated in the intermontane valleys have copious supply of water.

#### LATERITE

Laterite is confined to Hoskote and Devanahalli areas. Good exposures are seen round about Hoskote, Sulibela Nandagudi and Hindignal. It makes its appearance at an elevation of about 915 metres and presents a bedded table-top character. Laterites are vesicular and quite porous. The laterite formation is red to yellow in colour; soft when fresh but hardens on exposure to air. Laterites cover six to nine metres in thickness and is followed with a thick bed of variegated clay extending to 20 to 25 metres. Laterites occur in horizontal layers capping chiefly the underlying gneissic rocks.

#### MINERAL RESOURCES

Bengaluru Rural District is not rich in mineral resources. The important minerals which occur in the district are: asbestos, clays, garnet, limestone, ochre, quartz and ornamental and building stones.

#### CLAYS

China clay (kaolin) deposits abound in Nelamangala, Doddballapur and Hoskote taluks of which those near Gollahalli and Arjunbettahalli in Nelamangala taluk yielded large quantities of China clay, useful for high tension insulators and other ceramic products. Potter's clay is however available in plenty and this is mainly obtained from the tank silts. Clays are used for fire-bricks and other refractories. Other clays and lithomarges were used for stoneware pipes and potteries. Fire clay excavated in Hoskote taluk was 2,940 MT in 1981-82 and 700 MT in 1985-86. Whereas China clay excavated in 1985-86 in Ramangaram taluk was 285 MT, Hoskote taluk 1,560 MT and Doddballapur taluk 250 MT.

Small occurrences of amphibole asbestos are known from Bidadi.

#### QUARTZ

Quartz deposits are found on the hillocks near Doddballapur, Dommarahalli in Nelamangala taluk, Bannikuppe in Ramangaram taluk

and Kolar in Magadi taluk. The purest types, when crushed or ground to fine powder, could be used in many industries, such as the manufacture of glass, pottery and pottery glazes, silica bricks, sand-lime bricks and others. In addition, rock crystals are also noticed in a few pockets of the district. Production of quartz in Dodballapur taluk was 500 MT in 1983-84. It was 300 MT in Hoskote taluk and 250 MT in Ramanagaram taluk in 1985-86.

## GARNET

The occurrence of garnet has been found near Salhunse and Maralavadi in the Kanakapura taluk. Pink garnets occur in some of the quartzite bands and micaceous gneisses near Valgerehalli and other places to the south-east of Channapatna.

The only recorded occurrence of limestone in the district is near Chunchi of Kanakapura taluk. Nodules of impure red ochre near Nandagudi in Hoskote taluk were used in the past in paint manufacture. Neralamarada Doddi village near Harohalli in Kanakapura taluk has about 25,000 tonnes of Feldspar containing 11 to 16 percent alkalis ( $K_2O + Na_2O$ ) and a quantity of about 12,000 tonnes white quartz analysing 97 to 99 percent  $SiO_2$  while the indicated reserves of Feldspar would be about 40,000 tonnes. It is also found in Dodballapur taluk, production in 1983-84 being 1,383 MT. Corundum occurs in Channapatna taluk. The share of the district in the total output of corundum in the State is fairly high. Production figures for the item are 0.75 MT in 1982-83, 0.76 MT in 1983-84 and 0.35 MT in 1985-86.

## BUILDING AND ORNAMENTAL STONES

Building stones, particularly granites and granitic gneisses of different types varying in their structure, texture and colour, abound in this district. The famous Vidhana Soudha, one of the massive modern granite buildings in the country, has been built from the fine grained grey granite of Dodballapur. Equally famous are granite slabs from Bettahalasur and those from Koira hills in Devanahalli taluk. There are numerous quarries round about Bangalore and near Dodballapur and several other places, from where size stones, slabs of various dimensions, pillar stones and other materials are obtained. Granites and granitic gneisses are largely used for making road rollers, stone mortars and grinding stones for household purposes. Fine grained homogenous varieties, pink or grey, free from white streaks and veins of quartz are quarried to a large extent for production of dressed kerb stones and memorial and monu-

mental stones. Apart from ordinary granite stones, pink granite of fine grained uniform texture stones are found near Channapatna and Magadi and porphyritic types containing coarse crystals of pink feldspar with or without splashes of green minerals like chlorite and epidote are found in the granitic exposures near Ramanagaram and other places. These varieties, when dressed and polished, form good building and ornamental stones. Building stone valued at Rs. 80.56 lakhs in 1983-84 and 112.79 lakhs in 1984-85 was produced in the undivided Bangalore district. The figure for these respective years for ornamental stones were Rs. 411.70 lakhs and 452.87 lakhs. Major part of this was from the Rural District itself.

### GROUNDWATER

Groundwater in the district occurs in various geological formations, underwater table conditions and the groundwater recharge is mainly through precipitation. The water bearing formations include the altered and weathered gneisses and laterite. The depth to the unconfined water in the district is related to the altitude of the land surface. Generally the depth is more where the land surface is high, and shallow where the land surface is low. The depth of water ranges between one to three metres in Arkavati and Kanva basins. It is deeper in other parts and extends upto 12 metres depending on the topographic location of wells. The wells normally range in diameter between two to 10 metres and three to 12 metres in depth. The fluctuation in water-table between summer and monsoon water level ranges from one to four metres. The fluctuation is least in the low lying basins. The yields from wells range between 10 to 15,000 gallons per day. In exceptional cases where revitalisation is done by sinking bores from the bottom, the wells are yielding between 25 to 30,000 gallons per day. The yield from borewells in the district ranges between 800 to 1,000 gallons per hour.

The highly porous and sandy nature of the soil, weathered and jointed and fissured bed-rock permits increased percolation of meteoritic water underground. Smaller amounts are derived by infiltration of water used for irrigation. It is assessed that about 90 percent of the rain that is precipitated, is lost through surface run-off and evapo-transpiration and remaining 10 percent eventually seeps through and reaches the ground water reservoir. The following table indicates the groundwater utilization (as on 1.1.1987) in the district. In view of concentration of large number of irrigation wells in Hoskote and Devanahalli taluks, it has been found advisable to discourage the sinking of new wells as water supply is likely to decrease.

## GROUNDWATER UTILIZATION

Sl. Taluk no.	Gross annual Recharge  ham	Net annual Recharge  ham	Net annual dis- charge ham	Number of wells (1987)
1. Channapatna	7,325	6,226	2,400	1,795
2. Devanahalli	6,670	5,670	5,088	7,782
3. Dodballapur	10,008	8,507	2,551	3,010
4. Hoskote	2,527	6,308	5,808	6,696
5. Kanakapura	17,603	14,963	3,797	2,652
6. Magadi	11,012	9,360	2,132	3,069
7. Nelamangala	5,333	4,533	1,852	2,938
8. Ramanagaram	7,722	6,663	2,001	2,483
9. District total	68,200	62,330	25,629	30,425

\*ham = hectare metres

## FLORA

The natural vegetation of the area may be broadly grouped into two types: the hilly vegetation, and pond and river-bed vegetation apart from the roadside and avenue trees which are planted. The vegetation in general is regarded as deciduous jungle type with the exception of the valleys, and a majority of species inhabiting these areas exhibit xeromorphy. The Bannerghatta forests (in Anekal taluk) represent the original flora typical of this region, which includes dry deciduous and thorny shrub forests. Most of the area is under cultivation for several centuries and now there has been felling of all woody plants for fuel, resulting in growth of scrub vegetation. Vast areas are covered by thickest of extensive growth of lantana (bonthegalli/rojanhuvu) and other xeromorphic thorny shrubs rendering the area impenetrable and forming a most striking feature of the vegetation.

## VEGETATION OF HILLTOPS

The hilltop plateau is not rich in tree forms. Most of the area consist of barren rocks and huge tors. The area is constantly exposed to the direct action of the sun and wind. A few tree forms are scattered here and there and attain considerable height. The vegeta-

tion exhibits a high degree of xeromorphy such as thick tomentum, succulence, stunted growth, epidermal outgrowths like spines, thorns and hairs. As the plants occur in open clumps with plenty of space between them, these spaces are intruded by xeromorphic thorny and prickly species forming thickets. Sometimes these xeromorphic species attain considerable heights, assuming even tree form. The most common member is *Euphorbia antiquorum* (*chadarakalli*) with its angular stems and stipular thorns.

The common species found as components of the hilltop vegetation are: (names given in brackets are in Kannada) *Acacia nilotica* (*karijali*), *Acacia leucophloea* (*bilijali*), *Alangium salviifolium* (*kallu mavu*), *Albizia amara* (*chujjullu*), *Anogeisus latifolia* (*dindiga*), *Bauhinia racemosa* (*vanasampige*), *Cadaba fruticosa* (*keganike*), *Caesalpinia decapetala* (*Mysore thorn*), *Capparis grandiflora* (*tollumullu*), *Capparis sepiaria* (*hole uppina*), *Capparis zeylanica* (*kattari*) *mullina*), *Cassia fistula* (*kakke gida*), *Cipadessa fruticosa* (*situnde gida*), *Ficus benghalensis* (*ala*), *Gmelina asiatica*, *Helicteres isora* (*edamuri*), *Lantana tilaeefolia* (*roianhuvu*), *Tamarindus indica* (*hunise*), *Tarenna asiatica* (*tarani*), *Tecoma stans* and *Toddalia asiatica* (*kadu menasu*).

The undergrowth in these areas is represented by climbers and small shrubs such as *Abutilon indicum* (*srimudre*), *Aristolochia indica* (*savari beru*), *Barleria cristata* (*spatikada huvu*), *Cryptolepis buchanani* (*metaguli hambu*), *Decalepis hamiltonii* (*makali beru*), *Hemidesmus indicus* (*sugandi beru*), *Hibiscus vitifolius* (*mani tutti*), *Ichnocarpus frutescens* (*karehambu*), *Pavetta breviflora* (*sule-bottu*), *Peristrophe bicalyculata* (*cibirasoppu*), *Scutia circumscissa* (*kurudihanna*) and *Tylophora indica* (*adumuttada balli*).

The ground vegetation mainly consists of herbaceous forms and a covering of grasses and others like *Apluda mutica* (*kaduhanchi kaddi*), *Argemone mexicana* (*dattura*), *Barleria buxifolia* (*gandu kotti mullu*), *Boerhavia diffusa* (*ganajali*), *Byttneria herbaceae*, *Cassia occidentalis* (*koltagasi*), *Catharanthus pusillus* (*vishakanigalu*), *Cynodon dactylon* (*garikehullu*), *Dipteracanthus prostratus*, *Eragrostis cilianesis* (*bettadaa-kkabu hullu*), *Evolvulus alsinoides* (*vishnukanti*), *Fimbristylis barbata*, *Heteropogon contortus*, *Lagascea mollis*, *Pouzolzia auriculata*, *Sida acuta* (*visha kaddi*), *Sida veronicaefolia* (*batta garike*), *Solanum nigrum* (*kaki hannu*), *Vernonia cinerea* (*karehindi*), *Tephrosia purpurea* (*koggi*) and *Waltheria indica*.

#### VEGETATION OF HILL SLOPES

The hill slopes are poor in soil content and consist of steep rocks. There is continuous gully erosion resulting in the formation of channels. These bring about the exposure of the rocky substratum. The eroded surface remains rocky and bouldery with small deposits of soil here and there in the clefts along which the water carried soil and humus have accumulated by the death and decay of previous vegetation. The rocky slope is inhabited by the xeromorphic *Euphorbia antiquorum* (*bonthegalli*) and a few tree forms. The most conspicuous



members on the rocky slopes are the fleshy leaved *Anisochilus carnosus* (*karpurada gida*), *Aristida depressa*, *Borreria stricta*, *Cassia absus* (*adavi huruli*), *Catharanthus pusillus*, *Cynodon dactylon*, *Fimbristylis barbata*, *Heteropogon contortus* (*ubu hullu*), *Impatiens trichocarpa*, *Indigofera enchinata*, *Mollugo pentaphylla* (*kedarasi*), *Oldenlandia herbaceae*, *Polygala elongata* (*periyankank*), *Phyllanthus simplex*, *Sopubia delphinifolia* and *Vincoa indica*.

During the monsoon, the ground vegetation becomes rich and consists of a number of shortlived ruderals like *Borreria ocymodies*, *Cassia kleinii*, *Cassia tora* (*gandutagasi*), *Cleome monophylla*, *Didymocarpus tomentosus*, *Justicia simplex* (*eluvсандhi*), *Martynia annua*, *Ocimum canum* (*nayi tulasi*), *Plectranthus mollis*, *Polygala Chinensis* (*ghutani*), *Sesamum indicum* (*ellu gingelly*), *Sida veronicaefolia* (*batta garike*) and *opubia delphinifolia*. During summer, herbage of the hill is almost inconspicuous and the rocky boulders and slopes look barren. The exposed rocks show long crevices and possess a thin mantle of soil. These crevices and mantle support the following species. *Aristida depressa* (*kadu hanchihullu*), *Cleome monophylla*, *Curculigo orchioides* (*nelatale*), *Dactyloctenium aegyptium* (*buffalo grass: konana tale hullu*), *Indigoferaglabra* (*neeli balli*), *Iphigenia indica*, *Polygonum plebejum* (*seeranige soppu*), *Sebastiania chamaelea*, *Sopubia delphinifolia* and *Triumfetta annua*. The fringe of the hillock is bordered by great boulders and slabs of stone. Amidst these slopes and boulders there is a loose accumulation of soil and also supporting herbaceous vegetation. The lower part of the hillock which gradually merges with the plain has a shallow deposition of soil. These areas are subjected to drastic heat of summer and strong action of wind. The area is mostly inhabited by *Abrus precatorius* (*gulaganji*), *Acacia ferruginea* (*banni*), *Annona squamosa* (*sitaphala*), *Aristolochia indica* (*ishvari beru*), *Asparagus racemosus* (*ashadi beru*), *Carmona microphylla*, *Cassytha filiformis*, *Dendrocalamus strictus* (*karibiduru*), *Mimosa pudica* (*muttidare muni* touch-me-not), *Premna tomentosa* (*naravala*), *Pterolobium hexapetalum*, *Smilax zeylanica* (*kadu hambu tavare*), *Tecoma stans* (*creeper*), *Ziziphus oenoplea* (*surimullu*) and *Ziziphus xylopyrus* (*gedachi*). The tree forms consist of *Acacia nilotica* (*karijali*), *Acacia leucophleoa* (*bilijali*), *Alangium salviifolium* (*kallumavu*), *Albizia amara* (*chujjullu*), *Anacardium occidentale* (*geru*), *Anogeissus latifolia* (*dindiga*), *Cassia siamea* (*simetangadi*), *Dendrocalamus strictus* (*karibiduru*), *Mallotus philippensis* (*urabatti*), *Mitragyna parvifolia* (*kadavala*), *Ochna squarrosa* (*mudamara*), *Pongamia pinnata* (*honge*) and *Terminalia paniculata* (*huluve*).

## VEGETATION OF THE VALLEY

The valley is traversed by small streams supporting on either side thick vegetation simulating the evergreen type of vegetation. The forest floor is covered by thorny shrubs and stunted trees scattered here and there with an open canopy. The dominant members seen in the valley are the following. *Alangium salviifolium* (*kallumavu*), *Albizia amara* (*chujjullu*), *Anogeissus latifolia*, *Annona squamosa*, *Cassia siamea*, *Dendrocalamus strictus*, *Dichrostachys cinerea* (*vadavarada gida*), *Ficus religiosa* (*arali, pipal*), *Ficus tomentosa* (*kallarali*), *Firmiana colorata*, *Gmelina asiatica* (*shivani*), *Ixora notoniana*, *Mangifera indica* (*mavu; mango*), *Melia composita*, *Mitragyna parvifolia*, *Premna tomentosa* (*naravala*), *Sterculia urens* (*kempudale*), *Streblus asper*, *Tectona grandis* (*saguvani*), *Terminalia chebula*

(*alale*), *Trema orientalis* (*gorku*), *Vitex altissima* (*navutani*) and *Ziziphus xylopyrus* (*kodaci*). Scattered among these are also found small shrubs like *Atalantia monophylla*, *Atalantia racemosa* (*huchu-nimbe*), *Butea monosperma* (*muttuga*), *Dodonaea viscosa* (*hangarike*), *Gymnosporia montana*, *Flacourtia indica* (*miradi*), *Jatropha curcas* (*beta-haralu*), *Mimosa rubicaulis* (*urisige*), *Pavetta breviflora* (*sulebottu gida*), *Toddalia asiatica* (*kadumenasu*), *Ventilago moderaspata* (*uppali*), *Vitex negundo* (*kari nekki*) and *Ziziphus oenopia* (*sondli*). Man happens to be the most important factor in disturbing the vegetation by way of felling of trees and cutting of bushes for fuel. In addition, grazing and browsing by cattle and other animals have a marked effect on the vegetation. The effect of these factors on vegetation is highly devastating.

#### POND AND RIVER-BED VEGETATION

The river-bed has thick growth of vegetation on either side. Along the riverside, there is a continuous patch of *Salix tetrasperma* (*niravanji*) both north and southwards, associated with *Arundo donax* and *Saccharum spontaneum* (*darbehullu*). There are small puddles on the plateau which retain certain amount of rain water. These puddles are mostly inhabited by *Apongeton natans*. During September, October and November, these puddles are completely covered by *Apongeton natans* and the thick mat of floating leaves along with their brightly coloured spikes, in association with other aquatic plants like *Nymphaea nouchali* (*kennaidile*), *Nympoides indicum* (*mullu kombu*) and *Nelumbo nucifera* (*tavare*), form a pleasant site. Some tanks are inhabited by *Eichhornia crassipes* (*antarata vare*) and this with its blue flowers and floating leaves look picturesque. A few tanks are noticed with a pure association of *Typha angustata* (*naribala*) and *Polygonum glabrum* (*niruganigale*) or *Nelumbo nucifera* and *Polygonum lanigerum* (*bilitakta*). The water tanks are generally inhabited by members like *Aeschynomene aspera* (*kerebendu*), *Blyxa echinosperma*, *Cyanotis axillaris* (*negala kanne soppu*), *Cyperus articulatus* (*yeletollu jambuhullu*), *Echinochloa colona* (*kaduharaka hullu*), *Hydrilla verticillata* (*pachi*), *Hygrophilla auricularia* (*Nirugobbi*), *Leersia hexandra* (*sajjehulu*), *Limnophyton obtusifolium*, *Monochoria vaginalis*, *Ottelia alismoides* (*hasuru nirupatre*), *Polygonum glabrum*, *Rotala fimbriata*, *Scripus articulatus* and *Vallisneria spiralis* (*kudure-balada gida*). The common Pteridophytes noted in the puddles are the species of *Azolla*, *Marsilea* and *Salvinia*. Most of these tank flora are not indigenous.

The common roadside avenue trees mostly planted, are *Alstonia scholaris* (*saptavarna*), *Artocarpus heterophyllus* (*halasu*), *Azadirachta indica* (*neem; bevu*), *Cassia siamea*, *Dalbergia sissoo*, *Delonix regia* (*kakkikayi gida* or *ratnagandhi*), *Ficus benghalensis* (*ala*), *Ficus religiosa* (*arali*), *Firmiana colorata* (*marsigli*), *Holoptelea integrifolia* (*tapasi*), *Jacaranda mimosifolia*, *Kigelia pinnata* (*mara soute*), *Lagerstroemia speciosa* (*holedasavala*), *Madhuca indica* (*ippe*), *Mangifera indica* (*mango; mavu*), *Melia azadirachta* (*bevu*), *Mimusops elengi* (*ranjalu*), *Peltophoram inerme*, *Pongamia pinnata* (*Indian beech; honge*), *Polyalthia longifolia*, *Samanea saman* (*rain tree; male mara*), *Tamarindus indica* (*hunise*) and *Tecoma stans*.

During the major part of the year, the vegetation is active and remains dormant only for a few months starting from November and extending to May. This type of vegetation is common in open wastelands and cultivated fields. After the first showers of monsoon in May, the ground which is barren, becomes covered completely by green grass. As the monsoon advances, the ground vegetation becomes dominant and completely covered by many annual weeds, continue to flower till late in December. This vegetation consists of *Ammannia baccifera* (kallarive), *Angallis arvensis* (suryakanti soppu), *Argemone mexicana* (dattura), *Aristida depressa*, *Bidens biternata*, *Borreria hispida* (madan badami gida) *Celosia argentea* (anne-soppu), *Convolvulus rotterianus*, *Conyza stricta*, *Corchorus acutangulus*, *Crotalaria bifaria*, *Croton bonplandianus* (alpabendi soppu), *Digera muricata* (cencali soppu), *Eragrostis plumosa* (doddapurle hullu), *Euphorbia hirta* (achehe gida), *Fimbristylis barbata*, *Heteropogon contortus* (karipunugada hullu), *Imperata cylindrica* (sanna dabbe hullu), *Indigofera glabra*, *Lagascea mollis*, *Merremia tridentata*, *Nicotiana plumbagnifolia*, *Ocimum canum* (nayi tulasi), *Orthosiphon diffusus*, *Rotala fimbriata*, *Tridax Procumbens* (qabbu sanna savanti), *Triumfetta annua* and *Vicoa indica* (muquti soppu). In marshy and shady places, the common taxa are *Cassia Kleinii*, *Commelina benghalensis*, *Conyza stricta*, *Cyanotis laris* (negala kanna soppu), *Cyperus articulatus*, *Dentella repens*, *Ericocaulon quinquagulare*, *Gnaphalium indicum*, *Grangeamoderaspatana*, *Leersia hexandra*, *Limnophia conferta*, *Nesaea brevipes*, *Rotala densiflora*, *Rotala indica* and *Sphaeranthus indicus*. At the end of winter, most of them get dried up and only drought resisting species will still be in flower. Late in the winter and summer, the whole area becomes barren and completely dry and this is considered to be the inactive period of vegetation. The common cultivated plants in the district are: paddy (*Oryza sativa*), ragi (*Eleusine coracana*), jola (*Sorghum vulgare*), navane (*Setaria italica*), save (*Panicum miliare*), haraka (*Paspalum scrobiculatum*), maize (*Zea mays*), togare (*Cajanus indicus*), avare (*Dolichos lab-lab*), bengalgram (*Cicer arietinum*), greengram (*Phaseolus aureus*), blackgram (*Phaseolus mungo*), cowpea (*Vigna sinensis*), horsegram (*Dolichos biflorus*), gingelly (*Sesamum indicum*), groundnut (*Arachis hypogaea*), castor (*Ricinus communis*), coconut (*Cocos nucifera*), niger (*Guizotia abyssinica*), sugarcane (*Saccharum officinarum*), chillies (*Capsicum anum*), mustard (*Brassica nigra*), onion (*Allium cepa*), pundi (*Hibiscus cannabinus*), mulberry (*Morus alba*) and *Vitis vinifera* (Grapes).

In Bangalore District, flora families with more than 18 species are, in their order of dominance as follows. Fabaceae, Poaceae, Cyperaceae, Asteraceae, Euphorbiaceae, Acanthaceae, convolvulaceae, Rubiaceae, Malvaceae and Verbenaceae. Of the 216 species of Liliatae, 95 are in Poaceae and 66 in Cyperaceae; the remaining 55 are distributed over 21 families and 37 genera. Of 763 species of Magnoliatae, Fabaceae tops the list with 134 species followed by Asteraceae - 46 species and Euphorbiaceae - 40 species. Acanthaceae and Convolvulaceae include 36 and 26 species; Rubiaceae and Malvaceae have 24 each, while Scrophulariaceae, Lamiaceae and Solanaceae are all represented by 18 species each.

## FAUNA

Early reports indicate that the ancient forests which covered the District had the following wild animals - *simha*, the lion; *sardula*, the tiger; *harina*, the deer; *kapi*, the monkey; *bhalluka*, the bear; *kunjara*, the elephant; *srigala*, the jackal; *mahisha*, the buffalo; *bidala*, the cat; *chamara*, the yak or perhaps the bison. The lion no longer ranges the forests, nor are the elephant (as there are no thick forests). Bison and wild buffalo not to be met with though the first is said to appear occasionally in Kanakapura Taluk. The larger game consisting mainly of cheetah, wild dog, wild cat, etc., are mostly confined to the forests of Magadi, Ramanagaram and Kanakapura taluks. Occasionally herds of elephants make an appearance in the forests of Kanakapura taluk from neighbouring districts. Among the smaller animals, field rats are numerous. The bandicoot infests stables and the neighbourhood of manure pits. The natural distribution of animals is largely determined by vegetation. Moderate degradation of forests encourages growth of grass and shrubbery improving them as a habitat for larger animals. But undue decimation causes invasion of creeping weed vegetation like *lantana* and *Eupatorium* which prevent growth of more suitable forms of plant life. The dubious advantage of some animal species feeding on their berries, flowers etc. is offset by other hazards. There is a very little forest and what remains of it is highly fragmented. There are reports of the presence of a few wolves in this region but on the whole, the occurrence rating of the animals is very low. Spotted deer and Nilgai have practically disappeared due to the vulnerability of an open scrub habitat. Reptiles are well represented in the District. Lizards, snakes, turtles and crocodiles are also noticed. Amphibians like frogs and toads are commonly found all over the district. The common annelids represented in the district are the earthworms. Scorpions and spiders are the common arachnids living in the district.

Jungle fowl (*Gallus sonnerati*), pea fowl (*Pavo cristatus*), parakeet (*Psittacula eupatria*), wood pecker (*Chrysocolaptes de delessertii*), house sparrow (*Passer domesticus*), pheasant crow (*Centropus sinensis*), pigeon (*Columbia livia*), bustard, pond heron (*Ardeola grayii*), teal (*Dendrocygna javanica*), florikeen, partridge, quail, snipe and wild duck are the major avifauna found in the district.

Domestic animals consist principally of horses, cows, bullocks, buffaloes, sheep, goat, asses, pigs, dogs and cats. Bullocks, of excellent breed, are plentiful. They are the only animals used for agricultural operations though few buffaloes and cows are also used

occasionally. They are fed chiefly on ragi straw and the residue of the threshings of dry crops. The common village cows are inferior animals due to want of proper care and attention. They subsist entirely on the waste lands about the villages and on the stubble grazing after harvest. In recent days, cross-bred cows are also reared in the district. Sheep and goats thrive well in the district.

## FORESTRY

Bangalore Rural district has a geographical area of 5,814 sq km of which 1,094.35 sq km (approximately 18.8%) is under the control of the Forest Department. The reserved forest area is about 1,078.11 sq km, protected forest area is about 8.27 sq km and the rest is village forests. The unclassified areas include 'C' and 'D' class lands which are mostly barren and transferred from the Revenue Department to the Forest Department. The area surveyed and categorised upto the end of 1986 was about 15,465 ha of 'C' class land and 13,969 ha of 'D' class land. The main activities of the department are management of the forest, conservation of wild life, reforestation of degraded forest, afforestation of barren areas, social forestry etc. The territorial forest divisions in the district are as follows: The ranges of Hoskote, Doddaballapur, Channapatna, Satanur, Kanakapura and Ramanagaram in Bangalore Forest Division. Social forestry ranges are at Doddaballapur, Nelamangala, Ramanagaram, Magadi and Harohalli.

The earliest traditional accounts describe the district as covered with forests, forming a part of the great 'Dandakaranya'. The distinctive names of some of the wooded tracts were *Chandanaranya* (sandal forest) on the Arkavati river near Nelamangala; the *Gunjaranya* (forest of the *Abrus precatorius*), around Shivaganga; the *Kundaranya* (Jasmine forest) at Devanahalli, etc. The hilly taluks of Magadi and Kanakapura had the greatest proportion of forests. Trees and bushes had grown abundantly, especially in the ravines between the heights. The Channapatna taluk was also hilly but the tree vegetation was smaller. The remaining taluks were fairly wooded with trees in the long and hollow valleys of the downs. There was more scrub forest around Ujjanibetta and along the western border of Doddaballapur and Nelamangala taluks. The sandal was grown in Magadi, Channapatna and Kanakapura Taluks.

The forests of the district especially of the central and the western belts, contain valuable sandalwood though in much depleted numbers. Among the timber yielding species, a mention may be made of teak (*Tectona grandis*), the beetle (*Dalbergia latifolia*), and the honne (*Pterocarpus marsupium*). Acacias, *Jalarii* (*Shorea talura*), lac

tree), *dindiga* (*Anogeissus latifolia*) and *honge* (*Pongamia pinnata*) are also found in abundance. The different kinds of ficus with a spontaneous growth include the *mavu* (*Mangifera indica*), *nerale* (*Syzygium cumini*) and the *ippe* (*Madhuca latifolia*). Trees of lesser order which are useful as firewood and also bamboo are also found in almost all forest areas. In addition, there are casuarina plantations and eucalyptus plantations and quite a few farmers have found it more profitable to raise such plantations than crops in agricultural fields with poor soils. These trees yield poles which are required by construction workers and also provide firewood which is in great demand. Bamboo is an important item among the minor forest produce which includes items such as *alalekai*, *seegekai*, *honge beeja*, *hippe beeja*, tamarind, mango, jack fruit, nerale, barks and resins besides honey and bee wax.

### FOREST MANAGEMENT

The forests in the district are managed as per the prescriptions of the working plans which are prepared for periods of ten to 15 years after taking into consideration the type of forests, the condition of the existing crop, the demand for various forest produce and the requirement of area for conservation of soil, moisture, etc. and for maintenance of ecological balance and protection of environments. About 50 per cent of the State forests in the district are degraded. In addition to this, about 30,000 ha of revenue wastelands, which are not fit for agriculture are ordered to be transferred to the Forest Department which are mostly treeless. Afforestation work is taken up on a large scale in these areas. The forest wealth is systematically exploited on the principle of progressive and sustained yield encouraging the natural regeneration, reforestation and afforestation measures to meet the demands of the forest based industries.

### ECUCALYPTUS PLANTATION

Growing of Eucalyptus is limited to zones receiving 600 to 1,100 mm of annual rainfall, in the degraded areas, where also in the departmental plantations, it is mixed with local species. Its advantage is that it is not browsed or damaged by cattle, drought resistant, fire resistant, it coppices and hence come up when cut back and grows fast. These plantations were committed to industries those raised since 1974 have been excluded to make available to the people. Additionally plantations are raised under various socio-economic schemes like DPAP, NREP, RLEGP, soil conservation, social forestry and all eucalyptus plantations raised in areas getting less than

600 mm of rainfall are reserved for supply of firewood and small timber to the people as per an amendment to the forest act in 1984. The rate charged to the people is about 60 percent of the rate charged to industries. Even in case of the quantity allotted to industries, about 30 percent of the material which is in the form of lops, tops and barks, etc. is permitted to be availed off by the local people free of charge on headloads. Eucalyptus plantations are worked on a rotation of nine years in respect of original crops and eight years in respect of its coppice crop. Three to four coppice crops are harvested. The industries are permitted to extract the raw material by themselves under the departmental supervision. About 2,116 MT of Eucalyptus wood valued at about Rs 433,780 was extracted in the district during 1982-83.

### FOREST PROTECTION

The most deleterious factors in forests today are forest fires and excessive and uncontrolled grazing. There is a forest checkpost at Thorekadanahally in Satanur range to detect the smuggling of timber, Sandalwood, etc. in the district. The checkpost functions round the clock. Fire arms are supplied to the staff of the checkpost. Five fixed and two mobile wireless sets have been established all along the border to check elephant poaching, sandal smuggling and other illegal activities.

### EXPLOITATION

The forests are worked departmentally for the extraction of hardwood. The system of sale of standing trees has been completely given up. Felling and conversion are done by directly engaging labourers or through tender to logging contractors. The converted material is transported to the various departmental timber depots for disposal. The out-turn of pulp wood during the year 1987-88 in the district is 5,099 cubic metres. The out-turn of minor forest produces during the year 1987-88 are as follows: Beedi leaves 26,700 kg, tamarind 80 tonnes, cashewnut 580 kg, *antwalkai* 3,200 kg and miscellaneous items 1,470 kg. The number of saw mills in the district are as follows. Kanakapura range 9, Hoskote range 4, Dodballapur range 8, Devanahalli range 4, Nelamangala range 9, Satanur range 3, Magadi range 5, Ramana-garam range 9 and channapatna range 11.

There are number of cases of damage to standing agricultural crops, loss of cattle and injuries to human lives by elephants and other wild animals. The department takes up prompt action to pay compensation to the affected persons as per rules in force. Compensation paid towards damage caused by wild life during the year 1987-

88 is as follows. 1) Damage to domestic animals 35 cases, compensation Rs. 19,350. 2) Injury to human beings three cases, compensation Rs. 15,000. 3) Injury to crops 86 cases, compensation Rs. 24,660.

### SOCIAL FORESTRY

Karnataka Social Forestry Project with assistance from the world bank and Overseas Development Organisation of United Kingdom has been under implementation since 1983-84 with the following objectives: To supply fuel wood, small timber and fodder in the rural and semi-urban areas, to provide employment to rural people by raising plantations in wastelands thereby creating assets for village panchayats to increase their income, to protect the farmland against water and wind erosion, to improve the ecology and environment of the areas, etc. In Bangalore Rural district, there are six social forestry ranges. There are four temporary and 12 departmental nurseries in the district. About 16 lakh seedlings were distributed free of cost during the year 1987-88 and plantations were raised in gomal lands 36 ha, C and D class lands 39 ha, tank foreshore area 88 ha and road side plantation 59 km. From April 1987, maintenance of social forestry project and the plantations raised in the community lands have been completely transferred to Zilla Parishads. The following table shows the extent of area (ha) brought under social forestry in the district from 1987-88.

Taluk	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88
Channapatna	10	35	20	20	10	26
Devanahalli	10	57	72	45	95	45
Dodballapur	20	55	40	68	65	31
Hoskote	-	-	-	-	20	15
Kanakapura	20	95	-	15	10	16
Magadi	10	15	6	15	35	21
Nelamangala	-	-	-	-	15	25
Ramanagaram	10	25	16	16	10	23

### CLIMATE

The climate of the district is salubrious and very agreeable. It is free from extremes. The climate of the district is classed as the seasonally dry tropical savana climate, with four main seasons. The cold weather season, from December to February is a period of generally fine cool weather with mainly clear blue skies. It is a



period of little or no rainfall. the hot weather season begins in March. March is a dry month with low humidity. April and May are the months of considerable thunderstorm activity. The south-west monsoon season from June to September, is a moist, cloudy and rainy period. It is also a period of fairly strong and steady winds, blowing from the south-west to west. The north-east monsoon season from October is also a moist and rainy period but with slightly less clouding. Winds are weaker and blow from east-north-east to north-east. The change in wind direction from west-south-west to east-north-east between September and early October is very characteristic. The main features of the climate of the district are, the agreeable range of temperatures and the two rainy seasons, June to September and October to November, coming one after the other but with opposite wind regimes corresponding to the south-west and north-east monsoons. The marked thunder storm activity with occasional hailstorms and squalls in April-May and September-October are also typical. More than half of the annual rainfall occurs during the south-west monsoon period and about a quarter in the north-east monsoon period. Depressions in Bay of Bengal are also reflected in this region. Appreciable rainfall also occurs in April-May. Two other important features are the predominant low clouding and the more or less steady temperatures during the whole monsoon season, June to October, and the early morning dew and mist or fog during the months October to February.

#### RAINFALL

Records of rainfall in the district are available for periods ranging from 98 to 110 years. The details of the rainfall of these stations and for the district as a whole are given in tables II to V. The average annual rainfall in the district is 793.6 mm (1901-1950). The rainfall in the district varies from 725.5 mm at Hoskote to 844.8 mm at Ramanagaram. There are three different rainy periods covering eight months of the year followed closely one after the other. The district receives 51 per cent of the total annual rainfall in the south-west monsoon period i.e. June to September. The rainfall increases from June to September, with the maximum rainfall occurring during September. During the north-east monsoon period, which follows closely on the south-west monsoon, with perhaps a break of a week or ten days, the district receives as much as 26 per cent of the total annual rainfall. Thus about 80 percent of the annual rainfall falls during six months, June to November, the rainfall during October being about as much as during September. There is also good amount of rainfall during summer months of April and May and it is mostly in the form of thunder showers. Except for occasional drizzle due

to the incursion of the north east monsoon current, the period from December to February is generally dry. The variation in the annual rainfall from year to year is not large. In the fifty year period, 1901 to 1950, the highest annual rainfall in the district amounting to 165 percent of the normal occurred in 1903. The lowest annual rainfall which was 69 percent of the normal was recorded in 1923. In this fifty year period the annual rainfall in the district was less than 80 per cent of the normal in seven years, none of them being consecutive. However considering the rainfall at the individual stations, two consecutive years of such low rain fall is quite common, occurring four times at Kanakapura and one to three times in the remaining stations. On an average, there are 53 rainy days i.e. days with rainfall of 2.5 mm or more in a year in the district. This number varies from 48 at Hoskote to 56 at Ramanagaram. The heaviest rainfall in 24 hours recorded at any station in the district was 231.1 mm at Devanahalli on 1874 May 7. The annual rainfall in the district was between 600 to 900 mm in 33 years out of 50 years.

The major part of the rainfall and a large percentage heavy falls, specially during April to June and September-October, is associated with thunder storms. The highest total rainfall in a month was 485 mm in september 1897 in the district. Taking a year as a whole, about 85 per cent of the rainfall in the region occurs between 4 pm and 7 pm. The least rainfall occurs between 7 am to mid-day. The maximum rainfall occurs between 6 and 7 pm and the minimum rainfall between 10 and 11 am. In April, the maximum rainfall occurs between 10 pm and midnight and the minimum rainfall generally between 10 am and 2 pm. During May to August and in October, the maximum rainfall occurs between 9 pm and 3 am, the maximum being around midnight. (This is based on surveys between 1901 to 1980).

#### TEMPERATURE

There are two meteorological observatories at Bangalore, one in the city and the other at the airport. The records of the city observatory may be taken as representative of the meteorological conditions in the Rural district in general as they pertain to long period. April is usually the hottest month with the mean daily maximum temperature at  $33.4^{\circ}$  C and the mean daily minimum at  $21.2^{\circ}$  C. On individual days, in hot season, the day temperatures often go above  $36^{\circ}$  C. With the onset of the monsoon early in June, there is appreciable drop in the day temperatures but that in night temperature is only slight. In October the temperatures are as in the South-West monsoon season. Thereafter, the temperatures decrease. December is generally the coolest month with the mean daily maximum temperature

at  $25.7^{\circ}$  C and the mean daily minimum at  $15.3^{\circ}$  C. Nights during January are however slightly cooler than during December. On individual days during the period December to February, the minimum temperature drops down to about  $8^{\circ}$  C. The highest maximum temperature recorded at Bangalore is  $38.9^{\circ}$  C on 22 May 1931 and the lowest minimum was  $7.8^{\circ}$  C on 13 January 1884. The mean of the extreme annual range of temperature i.e. the difference between the highest and lowest temperature recorded in a year is about  $24^{\circ}$  C. Thus one may expect a range of  $25^{\circ}$  C between the highest and lowest temperatures recorded in a year. This range varies between  $22^{\circ}$  C and  $27^{\circ}$  C in individual years. A remarkable feature of the mean monthly temperature is the uniform steady temperatures observed for as long as four months from July to October with  $27.4^{\circ}$  C as the daily maximum temperature and  $19.1^{\circ}$  C as the daily minimum temperature. The mean daily temperature is  $23.6^{\circ}$  C, the variation during the four months being only  $0.3^{\circ}$  C. Similarly, during the cold and hot weather seasons the mean monthly temperatures are remarkably stable with a mean value of  $20.3^{\circ}$  C for the two months of December and January and a mean value of  $26.9^{\circ}$  C for the two months, April and May. There is a steep rise in temperature from about the middle of January to the beginning of March and slightly less rapid rise later upto the end of April, after which there is a slow rate of fall upto the middle of May and a more rapid rate of fall upto the middle of June. From the middle of June to the end of October, the day to day variation is insignificant. There is a slight rise of temperature from the middle of September to the beginning of October, in the transition period between the South-West and north-east monsoon seasons. After the end of October, there is a fairly rapid fall of temperature till the middle of May.

The monthly mean diurnal range of temperature is maximum in February-March when the sky is generally clear or lightly clouded and the air is least humid. It is minimum in July-August when the sky is nearly overcast and the air is very moist. It is seen that largest diurnal range occurs from the second week of February to the middle of March and the smallest range in the middle of July. The diurnal range is within one degree the same from the middle of June to the end of September. The maximum temperature of the day occurs at about 3 pm in all the months. The minimum temperature of the day occurs at about 6 am except from May to July when it occurs about an hour or so earlier. The temperature at 9-30 am and 9 pm is the mean temperature of a normal day within half a degree celcius. The normal temperature and relative humidity at Bangalore is appended in Table VI.

## RELATIVE HUMIDITY

Relative humidity is high during the period June to October, being between 80 per cent and 85 per cent on the average. Humidity decreases thereafter and in the period February to April, the air is comparatively drier, the afternoon relative humidities being some 25 per cent to 35 per cent. From May the relative humidity increases. Relative humidity has a fairly large diurnal range. The maximum relative humidity during the day occurs at about 6 am and the minimum at about 3 pm. The diurnal range is highest, 36 to 38 per cent, from February to April when the air is dry and lowest from July to October 18 to 23 per cent, when the air is moist. The lowest relative humidity in a year (24 per cent) occurs between 3 and 4 pm in March and the highest (87 per cent) at 6 am during August to October. Relative humidity as low as 83 to 86 per cent may sometimes occur in the afternoon hours in March and relative humidity as high as 100 per cent can occur during the rains and in the late night and early morning from October to February, when dew deposition or fog or mist occurs.

## CLOUDINESS

Skies are heavily clouded to over cast in the south-west monsoon season and to a lesser extent in the post-monsoon season. In the rest of the year, skies are mostly clear or lightly clouded. The skies are lightly clouded during the months December to March (2-3 Octas), with the afternoons being more clouded. From April onwards the cloudiness increases reaching a maximum in July with 7 Octas of clouds. The cloudiness decreases by October, with skies half clouded and the annual average of clouds is about five Octas. The following table gives the mean monthly total cloud amount and mean number of days with clear and overcast skies.

Month	8-30 am			5-30 pm		
	a	b	c	a	b	c
January	6	4	3.7	7	2	2.9
February	10	1	3.6	7	1	2.8
March	14	1	2.0	9	1	2.9
April	5	2	3.6	2	4	5.0
May	1	6	5.0	1	8	5.7
June	0	14	6.9	0	13	6.9

July	0	23	7.6	0	19	7.4
August	0	21	7.5	0	15	7.1
September	0	17	6.9	0	12	6.8
October	1	11	6.1	0	11	6.3
November	3	8	4.9	2	8	5.2
December	4	6	4.2	5	4	3.9
Annual	3.7	9.5	5.1	2.7	8.2	5.2

a - Days with clear sky; b - days with sky overcast; c - mean cloud amount (Octas of the sky), Octa - unit equal to area of one eighth of the sky used in specifying cloud amount.

### SUNSHINE

About 2,500 to 2,900 hours of sunshine are received every year over the district. During the winter months January - February, the duration of sunshine is highest and with the advance of the hot weather period and increasing cloudiness, a significant decrease in sunshine occurs. With the withdrawal of the south-west monsoon, about six to eight hours of sunshine a day is received and by December the winter conditions are re-established. The mean daily hours of sunshine at Bangalore for each month are as follows (based on data from 1958 to 1967). January 9.4, oversee July 4.6, August 5.3, September 6.1, October 6.7, November 7.9, December 7.8 and Annual 7.7.

### WINDS

The surface winds over the district have a fairly clearcut seasonal character, with easterly components predominating in one period and westerly components in the other. During the period May to September, the winds are west-south-west to west, while during the period November to March, they are east-north-east to east-south-east. April and October are the transition months when the change over from the easterly to the westerly wind regime and vice-versa takes place. The annual variation of the monthly mean windspeed shows two maxima and minima. The primary maxima is in July, when the westerly winds are prominent, with mean speed of about 17 kmph and the secondary maximum in January, when the easterly winds are prominent, with a mean windspeed of about 10 kmph. The two minima occur in the two transition months, April and October when the mean velocity is about 8 to 9 kmph. The increase in windspeed is well marked between May and June. The decrease between August and September is also well marked.

The diurnal variation of windspeed also shows the two maxima and minima. The principal maximum occurs generally between mid-day and 2 pm and the principal minimum between 4 and 6 am. The secondary minimum occurs between 7 and 9 am. The strongest winds in a year occur about mid-day to 2 pm in July and weakest winds between 5 and 7 am in March. The diurnal variation in wind direction is not prominent neither during June to September when the direction is mainly west-south-west nor in November to February. The direction is mainly east-north-east in November, east-north-east to east in December and January and east-south-east to east in February. In March and April, winds have a slight southerly component in the morning and night after 6 pm and northerly component in the morning. The highest windspeed recorded so far is 106 kmph at about 3.20 pm in a squall from the north-east on 3 May 1950. Two other severe squalls occurred on 10 May 1948 and 26 May 1947, when the highest wind speed reached 102 and 99 km respectively. The mean daily windspeeds in kmph for each month (based on the data from 1970 to 1980, height of sensor 14.6 metres above ground level) is as follows: January 11.8, February 11.8, March 10.9, April 10.2, May 14.1, June 22.2, July 22.1, August 22.5, September 13.5, October 10.3, November 10.2, December 11.3 and Annual 14.0.

#### SPECIAL WEATHER PHENOMENA

The most important weather phenomena affecting the climate of Bangalore are the thunderstorms and associated squalls and the early morning mist or fog. The curve of thunderstorm distribution during the year shows two maxima and two minima corresponding to the maxima and minima of rainfall distribution. The primary thunderstorm maximum occurs in April and May and the secondary maximum occurs in September and October. The two minima are in July-August and December-February. Thunderstorms occur generally between 4 and 9 pm, the highest frequency being at about 8 pm. They are associated with moderate to heavy, though short-lived rain showers, sometimes with hail. Some of the thunderstorms are accompanied by squalls which may at times be severe. Some thunderstorms in September and October occur late in the night or very early in the morning before 4 am. Early morning mist or fog occurs during October to January, with more frequency in December and January. There is a considerable dew deposition in the late night and early morning hours during November to February. The fog and the mist start early in the morning at 4 or 5 am and clear by about 9 or 10 am. A thick fog sometimes lifts up and stays as low stratus cloud for sometime. Table VII and VIII give the mean wind speed and special weather phenomena for Bangalore.

Table I

Taluk-wise Latitude, Longitude, Area, Population, Elevation, Raingauge Stations and Annual Normal Rainfall of Bangalore Rural District in mm

Taluk	Location				Area sq km (1981)	Population (1981)	Elevation (metres)	Number of Raingauge Stations	Annual normal rainfall
	Latitude		Longitude						
	from	to	from	to					
Channapatna	12°27'	12°45'	77°02'	77°17'	545	2,18,063	800-900	3	839.5
Devanahalli	13°04'	13°22'	77°30'	77°47'	451	1,37,981	800-900	2	750.4
Dodballapur	13°08'	13°30'	77°16'	77°39'	792	1,91,288	800-900	8	741.2
Hoskote	12°51'	13°15'	77°34'	77°55'	548	1,56,590	800-900 900-1500	5	725.5
Kanakapura	12°13'	12°48'	77°11'	77°36'	1,590	2,72,437	800-900	4	805.2
Magadi	12°48'	13°10'	77°02'	77°19'	801	1,80,626	800-900	6	777.2
Nelamangala	12°51'	13°19'	77°08'	77°26'	510	1,25,469	800-900	3	760.1
Ramanagaram	12°35'	12°52'	77°06'	77°26'	631	1,72,383	800-900 900-1500	4	844.8
District	12°13'	13°30'	77°02'	77°55'	5,814	14,52,044	800-900 900-1500	35	780.5

Table II

Normal rainfall and Normal rainy days for the rain gauge stations in the district from 1901 to 1950

Stations	No. of years of	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Annual		
Channapatna	50	a)	2.5	7.1	10.4	46.7	126.7	68.6	75.2	117.3	149.6	160.5	62.5	12.9	839.5	
		b)	0.3	0.5	0.7	3.3	7.7	4.8	6.3	7.4	7.9	8.6	4.2	0.9	52.6	
Devanahalli	50	a)	5.1	10.4	9.4	34.0	77.7	64.8	88.7	108.7	147.8	133.1	53.1	8.4	741.2	
		b)	0.4	0.5	0.4	2.3	4.9	4.4	7.6	7.9	8.6	7.5	4.0	0.7	49.2	
Dodballapur	50	a)	7.4	6.9	12.2	40.4	88.9	56.9	84.3	101.1	153.7	125.2	59.4	14.0	750.4	
		b)	0.5	0.6	0.7	2.6	5.5	4.7	7.5	7.9	8.1	7.9	4.2	1.2	51.4	
Hoskote	50	a)	4.6	6.6	13.7	40.1	92.5	56.6	74.2	96.5	131.3	137.7	62.0	9.7	725.5	
		b)	0.5	0.5	0.7	2.8	5.8	4.3	6.1	7.4	7.6	7.3	4.2	1.0	48.2	
Kanakapura	50	a)	3.1	5.6	10.9	49.8	128.0	57.1	69.6	104.9	148.1	155.5	59.4	13.2	805.2	
		b)	0.3	0.4	0.7	3.6	7.8	4.6	6.9	7.5	8.3	8.9	4.4	1.1	54.5	
Magadi	50	a)	4.8	4.8	5.1	36.1	98.3	65.5	72.4	127.5	154.4	143.0	55.4	9.9	777.2	
		b)	0.5	0.4	0.5	2.8	6.3	5.1	6.6	8.5	8.3	8.2	4.1	0.9	52.2	
Nelamangala	50	a)	3.3	5.3	6.9	42.7	93.2	60.2	83.8	115.6	141.5	139.5	59.2	8.9	760.1	
		b)	0.3	0.4	0.6	2.6	6.2	4.8	7.2	8.1	8.4	7.6	4.1	0.8	51.1	
Ramanagaram	50	a)	2.8	8.4	9.9	46.7	132.6	72.4	78.0	117.3	154.4	150.4	60.5	11.4	844.8	
		b)	0.3	0.5	0.8	3.6	8.0	5.3	7.0	8.1	8.8	8.5	4.4	1.1	56.4	
District normals (10 stations)		a)	4.7	7.1	7.1	10.0	42.7	106.4	63.1	82.1	114.1	148.2	143.9	59.7	11.6	793.6
		b)	0.5	0.5	0.6	6.5	4.9	7.0	8.1	8.3	8.1	4.3	1.0	1.0	52.7	

k.12 a) = Normal rainfall in mm.

b) = Average number of rainy days (days with rain of 2.5 mm or more)



Table III

Normal and Extreme Rainfall of Bangalore Rural District (based on all available data upto 1970)

Taluk	Normal rainfall	Heaviest rainfall in 24 hours (mm)	Highest annual rainfall as % of normal and year*	lowest annual rainfall as % of normal and year*	
Channapatna	839.5	221.5	1887 October 9	146 (1917)	62 (1904)
Devanahalli	750.4	231.1	1874 May 7	170 (1903)	52 (1950)
Dodballapur	741.2	190.5	1887 October 9	180 (1903)	58 (1923)
Hoskote	725.5	228.6	1874 May 5	189 (1903)	50 (1923)
Kanakapura	805.2	224.5	1897 September 22	154 (1903)	52 (1923)
Māgadi	777.2	127.5	1904 October 26	162 (1903)	60 (1945)
Nelamangala	760.1	139.7	1874 May 19	177 (1903)	56 (1907)
Rājanagaram	844.8	163.8	1897 September 22	168 (1903)	68 (1934)
District	793.6			165 (1903)	69 (1923)

\*Years of occurrence given in brackets.

Table IV

Taluk-wise rainfall statistics from 1962 to 1967

Taluk	Normal rainfall (mm)	1962 Annual rainfall	1963	1964	1965	1966	1967	1968	1969	1970
Channapatna	839.5	1,107.8	890.6	844.7	318.5	1,095.7	544.4	633.6	804.2	972.7
Devanahalli	750.4	753.8	732.8	1,004.2	442.4	944.0	537.5	550.4	674.0	NA
Dodballapur	741.2	715.9	946.9	1,428.2	437.3	999.7	994.9	575.4	758.5	678.9
Hoskote	725.5	1,019.2	748.0	1,209.0	406.2	1,107.7	646.8	788.8	995.4	973.2
Kanakapura	805.2	826.7	539.7	797.3	308.1	872.8	525.0	484.7	730.4	773.6
Magadi	777.2	1,062.4	804.2	928.4	558.0	796.9	548.0	320.2	NA	NA
Nelamangala	760.1	1,234.2	1,092.8	1,247.5	779.1	1,074.5	905.5	1,343.7	1,725.8	1,681.1
Ramanagaram	844.8	1,216.3	744.3	1,085.6	262.3	1,182.0	604.8	789.8	876.1	1,075.8
District	780.5	-	-	-	-	-	-	-	-	-

NA - Not available

Taluk	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Channapatna	931.3	1,095.7	1,021.1	820.1	1,230.2	399.9	635.3	859.6	926.6	744.8
Devanahalli	NA	NA	859.9	785.5	1,097.4	712.7	1,083.6	1,110.3	1,154.5	422.4
Dodballapur	1,079.5	698.3	940.2	998.0	1,177.9	669.2	985.0	886.5	879.2	665.4
Hoskote	1,056.0	946.8	1,008.5	1,101.1	1,314.8	760.3	856.6	819.4	856.7	480.8
Kanakapura	982.0	1,109.2	929.4	660.8	1,146.9	474.7	1,024.4	804.5	838.9	972.9
Magadi	NA	NA	1,731.9	1,201.5	2,013.5	1,044.9	966.0	1,182.4	1,606.1	1,351.4
Nelamangala	1,111.5	1,089.9	1,124.5	876.9	1,878.6	639.5	1,052.0	710.3	737.9	162.7
Ramanagaram	881.6	831.7	1,101.5	901.4	1,576.5	726.2	1,375.9	1,372.3	1,229.1	778.9
District	-	-	-	-	-	-	-	-	-	-

Taluk	1981	1982	1983	1984	1985	1986	1987
Channapatna	816.0	432.9	1,027.4	901.5	729.6	967.2	1039.6
Devanahalli	1,115.6	411.5	726.6	874.4	331.8	679.2	705.0
Dodballapur	754.5	422.1	672.3	609.4	512.6	823.5	638.9
Hoskote	720.4	379.5	694.2	710.1	467.7	1,176.1	1009.0
Kanakapura	1,011.5	377.4	792.0	548.0	418.0	958.0	1084.0
Magadi	1,482.8	696.3	1,085.7	843.6	637.9	1,307.9	1038.5
Nelamangala	816.3	369.5	595.7	406.4	244.8	782.2	734.7
Ramanagaram	765.2	477.7	924.4	690.2	646.0	988.2	891.8
District	-	-	-	-	-	885.3	888.5

Table V

Frequency of annual rainfall in the district (data 1901 to 1950)

Range in m m	No. of years	Range in mm	No. of years
501 - 600	4	901 - 1,000	6
601 - 700	11	1,001 - 1,100	6
701 - 800	15	1,101 - 1,200	0
801 - 900	7	1,201 - 1,300	0
		1,301 - 1,400	1

Table VI  
Normal temperature and relative humidity at Bangalore

Month	Mean Daily,		Heaviest max ever recorded		Lowest minimum ever recorded		Relative Humidity	
	Max °C	min °C	°C	Date	°C	Date	0830*%	1730*%
Jan	26.9	15.0	32.2	1925 Jan 30	7.8	1884 Jan 13	77	40
Feb	29.7	16.5	34.5	1969 Feb 23	9.4	1884 Feb 6	67	29
March	32.3	19.0	37.2	1925 Mar 30	11.1	1884 Mar 5	63	24
April	33.4	21.2	38.3	1931 Apr 30	14.4	1894 Apr 26	70	34
May	32.7	21.1	38.9	1931 May 22	16.7	1945 May 6	75	46
June	28.9	19.7	37.8	1926 Jun 2	16.7	1890 Jun 17	82	62
July	27.2	19.2	33.3	1914 Jul 1	16.1	1882 Jul 31	86	68
August	27.3	19.2	33.3	1899 Aug 6	14.4	1882 Aug 4	86	66
Sep	27.6	18.9	33.3	1951 Sep 16	15.0	1883 Sep 25	85	62
Oct	27.5	18.9	32.2	1976 Oct 4	13.2	1974 Oct 31	83	64
Nov	26.3	17.2	31.5	1959 Nov 3	9.6	1967 Nov 15	78	59
Dec	25.7	15.3	31.1	1926 Dec 18	8.9	1883 Dec 29	78	51
Annual	28.8	18.4					77	50

\*Hours Indian Standard Time

Table VII

Mean wind speed in km/hr (Bangalore)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
10.4	9.7	9.4	9.0	11.8	17.1	17.5	15.2	12.1	8.2	8.5	9.6	11.5

Table VIII

Special weather phenomena (Bangalore)

Mean no. of days with*	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.5	1.2	7.0	12.0	4.0	2.0	4.0	4.0	7.0	1.3	0.1	43.0
Hail	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Dust-storm	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.6	0.1	1.3
Squall	0.0	0.0	0.1	0.4	0.9	1.1	0.6	0.6	0.3	0.2	0.0	0.0	4.0
Fog	3.0	0.4	0.2	0.1	0.2	0.1	0.3	0.7	0.6	1.5	1.6	3.0	12.0

\* No. of days 2 and above are given in whole numbers.